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PRESSURE-EQUALIZING PADDING FOR HOT PRESSES AND RECOOLING PRESSES
[Druckausgleichspolster für Heiz- und Rückkühlpressen]

Bruno Hennecken, et al.

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INVENTOR	(72) :	HENNECKEN, BRUNO; ESPE, ROLF
APPLICANT	(71) :	RHEINISCHE FILZTUCHFABRIK GMBH
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Description

The invention relates to pressure-equalizing padding for hot presses and re-cooling presses which is produced by using a fabric which is permanently temperature-resistant up to, at least, 200°C; from the German utility model document 29619737.8, a press pad is known to the art with a textile yarn fabric. Compared to other press pads which are known to the art, this press pad is said to distinguish itself by an extended service life, even under high mechanical stress. However, the characteristics which, normally, are required of the press pad, namely, the padding effect and the fine heat transfer, are not to be reduced, but, rather, promoted. To realize this objective, the textile yarn for the production of the press pad fabric is to include flame-resistant melamine resin fibers.

From the German utility model document 9017587.5, a press pad of an asbestos-free material is known to the art for high-pressure presses for the production of high-pressure laminates. So that, compared to the press pads which were previously used for this purpose, this press pad will distinguish itself through an especially fine pressure equalization over the surface while additionally facilitating a noticeably shortened production cycle, the suggestion is made that the flexible press pad fabric be comprised of an aromatic polyamide yarn which, possibly, may be mixed with other yarn materials. Moreover, the textile fabric is said to contain metal yarns in a percentage between 0 and 70 wt.% relative to the total weight of the press pad.

Moreover, from the European patent application document EP 0713762A2, a press pad is known to the art for high-pressure and low-pressure presses that is made from a material which is characterized by the following components:

Group 1

1.1) Aromatic polyamide yarn which, possibly, is mixed with other yarn materials and contains any desired percentage of metal threads,

1.2) metal yarn.

Group 2

2.1) Heat-resistant filament of rubber or a rubber mixture,

2.2) heat-resistant filament of silicone or a silicone mixture,

2.3) heat-resistant elastic plastic filament,

2.4) material of the groups 2.1, 2.2, and/or 2.3 with a metal core, whereas the latter does not have to be firmly connected to the surrounding material,

2.5) material of, at least, one of the groups 2.1 to 2.4 with metal threads laid around it,

2.6) yarn of group 1.1, but without metal threads.

Compared to the previously used press pads, this press pad is to distinguish itself through an especially palpable, improved padding effect, again, with a simultaneously fine heat transfer.

Depending upon the thread material which is used to produce the padding fabric, the various demands placed in pressure-equalizing padding can be met more or less effectively.

A high permanent temperature resistance of the pressure-equalizing padding merely requires that, e.g., in the case of the use of thermoplastic thread material for the padding fabric, the thread material exhibits an accommodation point at a pertinent high temperature.

If a fine heat conductivity is expected from the pressure-equalizing pad, the padding fabric can be produced from a mixture of thread materials of which some have only low heat-conductivity and some consist of thread material which may, for instance, contain metal threads with a high heat-conductivity. Instead of combining different threads, thread material can also be used which consists of uniform threads, whereas each thread, in itself, consists of a material mixture of material with a particularly high heat-conductivity and of material with less heat-conductivity.

Nearly all pressure-equalizing padding is to have a certain amount of elasticity. This is realized by producing the padding fabric using elastic thread material.

Depending upon the thread material or the combined thread material mixture which is used to produce the padding fabric and depending upon the way in which the padding fabric is woven, the previously described characteristics of pressure-equalizing padding can be realized more or less pronounced.

It has become evident that thread material promoting the elasticity of the pressure-equalizing padding that is produced cannot easily be processed on modern, high-performance looms. The cause for

this is the change in the length of a thread of an elastic material which already occurs as a result of a low impact of tensile forces.

Thus, because pressure-equalizing fabrics are produced on the greatest variety of loom types, the thread material for such fabrics must also be universally usable. The materials which have been offered on the market so far meet these requirements, more or less, unsatisfactorily. Above all, with modern high-performance looms, very high stresses occur not only in the warp direction, but also in the weft direction. In this context, materials of pure silicone or silicone-jacketed metal threads have proved to be particularly disadvantageous. Naturally, the latter are not intimately connected with the silicone surface which, in the weaving process, predominantly, in modern high-performance looms, results in the silicone surface also becoming detached from the inelastic metal wire in the longitudinal direction, due to its elasticity. In practice, this leads to broken threads and to downtime in the production as a result.

Thus, this disadvantage cannot easily be rectified by using a thread of an elastic material with a metal filament core.

From the German laid-open patent specifications 2338749, producing a flexible transportation and press substrate from a glass fiber fabric is also known to the art in which the individual warp and weft threads and/or the entire fabric is impregnated or jacketed with a plastic material which are or is resistant against the press temperature.

The processability of the thread which is realized as a result of the longitudinal stabilization on modern high-performance looms causes another disadvantage which becomes evident if pressure-equalizing padding produced with such threads is used.

The padding fabric which is highly stressed by pressure and temperature is constantly subjected to alternating tensile stress. In this process, the frictional connection between the longitudinally stable thread core of metal or glass and the rest of the thread material is lost. Rapid wear of the pressure-equalizing padding is the inevitable consequence.

The invention is based on the objective of proposing pressure-equalizing padding for heating and re-cooling presses which, compared to traditional heat-equalizing padding, is able to not only meet the demands placed in such padding, such as, specifically, a great ability to relax and fine heat conductivity, but in which the fabric required for this consists of thread material that can be processed without any problem on modern high-performance looms.

In accordance with the invention, on the basis of pressure-equalizing padding of the kind mentioned in the preamble of Patent Claim 1, this objective is realized by the characterizing portion of the distinguishing features specified in Patent Claim 1.

Due to the combination of the threads of an inelastic thread core and an elastic thread material in accordance with the invention, a thread is created which, on the one hand, is longitudinally stable while, on the other hand, being elastic. The longitudinal stability

of the thread is an essential prerequisite for the easy processing in modern high-performance looms. The radial elasticity of the thread is a characteristic which has a decisive influence on the changeability of the thickness of the fabric in a direction vertical to its plane which is usually desirable.

Finally, the material combinations in accordance with the invention guarantee that the frictional connection between the inelastic thread core and the elastic thread surface remains preserved over a long service life of the pressure-equalizing padding, even under the results of high pressure and temperature stresses.

Depending upon the material combination chosen for the thread core and the thread surface, it may be advantageous to choose a mono-filament or a multi-filament as a thread core. Due to the twisting of a multi-filament into a thread core, a thread surface attached on it can be connected with the thread core with particular stability because the material of the thread core can be introduced into radially open intermediate spaces of the thread core.

If a fine heat transfer is expected from the pressure-equalizing padding, the materials proposed for the thread core and the thread surface really are opposed to this objective because they only possess relatively poor heat conductivity. However, the heat conductivity of the pressure-equalizing padding can be improved in accordance with a configuration of the invention in that the thread surface is produced with the addition of metal powder.

Preferably, the thread surface contains powder of copper and/or brass and/or bronze and/or aluminum.

Through tests, it could be substantiated that the heat transfer values which are normally expected of pressure-equalizing padding can be obtained if, in accordance with an additional configuration of the invention, the thread surface is comprised of a material mixture of 90:10 to 40:60 parts by weight of a silicone elastomer metal : metal powder.

A particularly advantageous configuration of the invention provides that the thread surface consists of a material mixture which exhibits a specific weight of more than 1.4 g per cm^3.

Thread material with a surface of a material mixture with a lower specific weight has proved to be disadvantageous during its processing, but especially also when the press pad produced from it is used. The heat conductivity is too low for the requirements of modern heat presses and re-cooling presses.

Finally, one configuration of the invention also provides that the thread exhibits a minimum tensile strength of 50 N/mm^2.

Pressure-equalizing padding of a fabric with threads which exhibit the claimed minimum tensile strength, beginning with the processing of the thread up to the use as the press pad, fulfill all expected stability requirements.

Patent Claims

1. Pressure-equalizing padding for heat presses and re-cooling presses produced by using a fabric which is permanently heat-resistant

up to, at least, 200°C, which contains threads that, respectively, are comprised of a thread core and a thread surface, characterized in that the thread core is produced from an aromatic polyamide and/or a duroplast material and/or preoxidized polyacrylonitrile and/or polyimide and/or polybenzidazole and/or aramide, and the thread surface is produced from rubber and/or silicone elastomer and/or polytetrafluoroethylene.

2. Pressure-equalizing padding, in accordance with Claim 1, characterized in that the thread core consists of a mono-filament or a multi-filament.

3. Pressure-equalizing padding, in accordance with Claim 1 or 2, characterized in that the thread surface is produced with the addition of a metal powder.

4. Pressure-equalizing padding, in accordance with Claim 3, characterized in that the thread surface contains powder of copper and/or brass and/or bronze and/or aluminum.

5. Pressure-equalizing padding, in accordance with Claim 3 or 4, characterized in that the thread surface consists of a material mixture of 90:10 to 40:60 parts by weight of silicone elastomer metal powder.

6. Pressure-equalizing padding, in accordance with any of the Claims 1 to 5, characterized in that the thread surface consists of a material mixture which exhibits a specific weight of more than 1.4 g/cm.

7. Pressure-equalizing padding, in accordance with any of the Claims 1 to 6, characterized in that the thread exhibits a minimum tensile strength of 50 N/mm^2.